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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/812,653	03/29/2004	Charles M. Lieber	H0498.70112US01	3416

7590 01/02/2009
Timothy J. Oyer, Ph.D.
Wolf, Greenfield & Sacks, P.C.
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Boston, MA 02210

EXAMINER

WEISS, HOWARD

ART UNIT	PAPER NUMBER
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2814

MAIL DATE	DELIVERY MODE
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01/02/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/812,653	LIEBER ET AL.	
	Examiner	Art Unit	
	Howard Weiss	2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 October 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 123 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 123 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>10/24/2008</u> | 6) <input type="checkbox"/> Other: _____ |

Attorney's Docket Number: H0498.70112US01

Filing Date: 3/29/04

Continuing Data: Continuation of 10/033,369 (10/24/01 now U.S. Patent No. 6,781,166)
which is a Continuation of PCT/US00/18138 (6/30/00) and claims
benefit of 60/142,216 (7/2/99); RCE established 11/2/2007

Claimed Foreign Priority Date: none

Applicant(s): Lieber et al. (Rueckes, Joselevich, Kim)

Examiner: Howard Weiss

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

2. Claims 123 is rejected under 35 U.S.C. 103(a) as being unpatentable over Melzner et al. (U.S. Patent No. 5,774,414) and Brandes et al. (U.S. Patent No. 6,445,006).

Melzner et al. show most aspects of the instant invention (e.g. Figures 2 and 3) including an electrical crossbar array comprising a plurality of crossed conductors **3,11** defining memory elements switchable, via the application of electrical

potentials, between two readable states **U,O**, one of the wires deformable (i.e. movable) from a first position to a second position to turn “on” or turn “off said memory elements.

Melzner et al. do not show the one of the conductors to be a nanotube. Brandes et al. teach (e.g. Figure 9 and Column 2 Lines 31 to 40) to use nanotubes in MEMS devices to capitalize on the semiconducting properties of carbon nanotubes (Column 8 lines 1 and 2) and their unique mechanical and electrical properties (Column 8 Lines 62 to 66). It would have been obvious to a person of ordinary skill in the art at the time of invention to have wires in electrical or Van der Waals contact and made of nanoscopic single or multiwall carbon nanotubes and auxiliary circuitry including transistors, capacitors and contact electrodes as taught by Brandes et al. in the device of Melzner et al. to capitalize on the semiconducting properties of carbon nanotubes.

Response to Arguments

3. Applicant's arguments filed 10/24/2008 have been fully considered but they are not persuasive. The Examiner's arguments in previous office actions are still relevant and are considered repeated herein. The Applicants state that the nanotubes in Brandes et al cannot be incorporated into the device of Melzner et al. since the movable conductors in Melzner et al. device have both ends fixed while the nanotubes in the MEMS devices of Brandes et al. are required to have only one fixed end and not under any compressive stress. First, the characterization that Brandes et al. teaches that the nanotubes can not be fixed on both ends is incorrect. The embodiments shown in Brandes et al. (Figures 11 to 13) are “various illustrative microelectromechanical devices produced using carbon nanotubes” (Column 9 Lines 1 to 3) and are not limiting to other variations, modifications and other embodiments suggested by themselves to those of ordinary skill in the art (Column 10 Lines 17 to 24). These embodiments do illustrate the flexibility and versatility of nanotubes as main agents in microelectromechanical devices properties directly

applicable to the device of Melzner et al. Disclosed examples and preferred embodiments do not constitute a teaching away from a broader disclosure or nonpreferred embodiments. *In re Susi*, 440 F.2d 442, 169 USPQ 423 (CCPA 1971).

Additionally, all the claimed elements were known in the prior art and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of invention. See Supreme Court Decision in *KSR International Co. v. Teleflex Inc.*, 550 U.S. --, 82 USPQ2d 1385 (2007). In view of these reasons and those set forth in the present office action, the rejections of the stated claims stand.

Conclusion

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

5. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should

you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at **866-217-9197** (toll-free).

6. Papers related to this application may be submitted directly to Art Unit 2814 by facsimile transmission. The faxing of such papers must conform with the notice published in the Official Gazette, 1096 OG 30 (15 November 1989). The Art Unit 2814 Fax Center number is **(571) 273-8300**. The Art Unit 2814 Fax Center is to be used only for papers related to Art Unit 2814 applications.
7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Howard Weiss at **(571) 272-1720** and between the hours of 7:00 AM to 3:00 PM (Eastern Standard Time) Monday through Friday or by e-mail via Howard.Weiss@uspto.gov. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy, can be reached on **(571) 272-1705**.
8. The following list is the Examiner's field of search for the present Office Action:

Field of Search	Date
U.S. Class / Subclass(es): 257/211; 365/151; 977/ 932	Thru 12/29/2008
Other Documentation: none	
Electronic Database(s): EAST	Thru 12/29/2008

HW/hw
2 January 2009

/Howard Weiss/
Primary Examiner
Art Unit 2814